

supposed. In the south-west are long bands of sand, not exceeding eight days' march in width. Adrar-Temar, the country of the travellers, is placed like a long and narrow island between two of these bands of sand. It is an almost level region, slightly elevated above the sands, which tend to encroach upon its borders. Intermittent streams are found in the country, and there are numerous towns or large villages, containing a considerable population. The three pilgrims represent their country as covered with gum-acacias, and ostriches greatly abound. The most important commercial fact in connection with Adrar is the existence at Ijil of an immense deposit of rock salt, which, as we advance towards the country of the negroes, becomes the most valuable article of trade. Tichu (? Tishit), some days' journey to the south-east of Ijil, is the principal market for the trade in salt, for which slaves are the principal exchange.

HERR CLEMENS DENHARDT, who has just returned to Germany from an exploring tour in Eastern Central Africa, has received a grant of 500 marks (20*l.*) from the Gesellschaft für Erdkunde, at Berlin, to defray the cost of publishing his notes of travel.

M. GRANDIDIER, the explorer of Madagascar, has been appointed president of the governing body (Section Centrale) of the Paris Geographical Society for 1879. Admiral La Roncière Le Nourry has been continued president of the Society. The Geographical Society of Paris is preparing to hold a reception when Prof. Nordenskjöld arrives in France; but the first step will be taken by the Society of Marseilles, the city at which Nordenskjöld will land from Naples, according to all probability.

WE learn from the last number of the *Izvestia* of the Russian Geographical Society that the expedition of M. Pyetsoff to Mongolia was very successful. M. Pyetsoff, after having stayed seven days at Koukou-khoto, started for Kalgan (in the south-east part of the Gobi steppe) where he remained for two months, studying the trade of China with Mongolia. Thence the expedition went to Urga, and from Urga to Ulassoutai, following thus a route which never was before explored. From Ulassoutai M. Pyetsoff turned west to the Chuyra river, which was reached at Kosh-agach; this route was quite unknown until now. On the whole thousand miles' distance between Urga and Kosh-agach the expedition made a survey, and M. Pyetsoff determined the latitudes and longitudes of twelve points. On the whole the expedition has made, on its way from Khobdo to Kalgan and thence to Kosh-agach, no less than 2,700 miles of surveys, and determined astronomically the position of twenty-six points, all longitudes being determined as well by chronometers as by the occultations of stars. Barometrical measurements were made during the whole journey, and very rich zoological, botanical, and mineralogical collections were obtained.

THE St. Petersburg Geographical Society has received news from Col. Prjvalsky, *via* Pekin. The intrepid traveller has safely arrived at Zaidam, on the Tibetan frontier, after having crossed the hitherto unknown country from Hami *via* Shatsheu to Zaidam. From the latter place he will proceed to the interior of Tibet. News has also been received from the chief of the so-called Samara Expedition, referring to the readiness of the Chiwinz tribe to restore the old course of the Amu Darya by destroying the dykes on the lower part of the river. The expedition sent out by the Russian Government Office for Communications, under Col. Gluchowski, and charged with the investigation of the lower course of the Amu Darya, with a view to rendering it navigable in future, also begins to show signs of activity.

THE "Karl Stangen'sche Reisebureau," at Berlin, will publish a description of its first journey round the world (1878-79) early in March, this description to serve as a guide for future journeys and intending tourists.

THE EFFECTS OF UNINTERRUPTED SUN-LIGHT ON PLANTS

PROF. SCHÜBELER of Christiania, who for nearly thirty years has been engaged in observing the influence exerted by differences of climate on vegetation, has published the result of his observations in recent numbers of our Norwegian namesake, *Naturen*. The first of the series of his observations, which he has given in detail, refer to winter-wheat, and were undertaken with the special view of noting

what effect the almost unbroken sunlight of the short Scandinavian summers had on plants raised from foreign seed. The experiments were made with samples of grain from Bessarabia and Ohio, and in both cases it was found that the original colour of the grain gradually acquired each year a richer and darker colour—the difference being perceptible even in the first year's crop—until it finally assumed the yellow-brown tint of other home-grown Norwegian winter-wheats. Similar results were obtained with maize, different kinds of garden and field peas and beans, and certain other garden plants, as celery, parsley, &c. In no case has Dr. Schübeler found that an imported plant, capable of being cultivated in Norway, loses in intensity of colour after continued cultivation; while in regard to many of the common garden flowers of Central Europe, he believes it may be asserted with certainty, that after their acclimatisation in Norway, they acquire an increase of size, as well as an augmentation of colour. These altered conditions are more forcibly manifested the further north we go, within the limits of capacity of vegetation for different plants. Thus it has been observed by Prof. Wahlberg of Stockholm, that *Epilobium angustifolium*, *Lychnis sylvestris*, *Geranium sylvaticum*, and many other plants common to Lapmark and the more southern districts of Sweden, attain in the former a size and brilliancy of tint unknown in the latter. The change in the case of *Veronica serpyllifolia* and *Trientalis europæa* is remarkable; the former changing as it goes further north from a pale to a dark blue, and the latter from white to rose-pink. It is noteworthy that a tinge of red is a common characteristic of the vegetation of the Scandinavian Fjelds; this being observable alike in blue, yellow, green, and white colours.

Colour is not, however, the only property affected by the unbroken continuance of daylight in the summers of Scandinavia, for according to Dr. Schübeler, the aroma of all wild and cultivated fruits, capable of cultivation in the northern lands, is much greater than that of the same fruits when grown in more southern countries. This is especially observable in regard to strawberries, cherries, and the various kinds of wild marsh and wood berries. In corroboration of this, Prof. Flückiger of Strassburg has found that the Norwegian juniper yields a much larger amount of essential oil than can be obtained from the shrub when grown in Central Europe. This excess of aroma in northern plants and fruits co-exists with an inferior degree of sweetness; thus the common golden-drop plum, and the green-gage of Christiania, or Thronbjem, although large, well-coloured, and rich in aroma, are so deficient in sweetness as to seem unripe to those who have eaten these fruits in France, or Southern Germany.

Dr. Edmond Göze, who has long been resident at Coimbra, informs Dr. Schübeler, that his observations on the fruits of Portugal enable him to corroborate that observer's opinion in regard to the different conditions on which aroma and sweetness respectively depend. The strawberries grown in large numbers near Coimbra are, he says, of great size, extremely sweet, but almost wholly deficient in aroma and flavour. The same remark refers to the Portuguese wines, when compared with the highly flavoured yields of the Rhenish and other northern vineyards; and a consideration of these varying conditions leads him to accept as an established fact, that light bears the same relation to aroma, as heat does to sweetness.

This increase of aroma, or intensification of flavour, due to the uninterrupted action of the sun's light, has the effect of making some of our most savoury garden plants almost uneatable in Scandinavia. Thus Dr. Schübeler has found that common white stick-celery, which had been grown near Christiania with careful attention to the methods followed in England, and which in outward appearance could not be distinguished from plants brought direct from Covent Garden Market, had a sharp unpleasant taste, when compared with the milder and more agreeably flavoured English plants. The same result was observed in garlick, shalots, and onions, and although it must be admitted that as the expressions of mere individual taste, the writer's conclusions in regard to this point are open to doubt, it should at the same time be borne in mind that they are based on practical observations and experiments, continued for nearly thirty years, and confirmed by the concurrent testimony of several of his colleagues, who, like himself, were desirous of deducing practical results from the acclimatisation of plants in Norway. From this point of view, some of Dr. Schübeler's observations are especially interesting, and in the present low condition of Norwegian industrial development, their practical

application would be highly important. Thus, he shows that while linseed oil is obtained in Holland, Germany and Middle Russia in the proportion of about 3 or 4 p. c. of the weight of the plants from which it is extracted, the yield from uncultivated plants in Norway varies from 4 to 5, or 5 to 8 per cent. Again his experiments of the yield of the essential oil of lavender, have convinced him, that plants grown in Christiania or Thordhjem, when compared to those grown near Merton, which have hitherto been regarded as the first in the world, greatly excel the latter in aroma, and he considers that the cultivation of this plant could be carried on with undoubted success on the coast-lands of Norway.

While Dr. Schübeler has no hesitation in maintaining that light engenders aroma, as heat engenders sweetness, he has not been able to determine to what extent the vegetable alkaloids are affected by either. In connection with his own observations, he reports some curious particulars in regard to the action of continuous light in the polar regions, which he has obtained from intelligent residents, who had undertaken to conduct certain experiments under his direction. Thus it was found both at Alten in West Finmark, and at Stamsund in the Lafodens, that plants of *Acacia lophantha* never contracted their leaves during the two months, or longer, that the sun remained above the horizon. An experiment was made at Alten to shade one half of the crown of an acacia during the night, and the result was that in about twenty minutes' time, the protected leaves began to contract, and remained closed until the plant was again wholly exposed to the midnight-sun, when after a time the leaves began slowly to unfold. At Stamsund it was observed that whenever the acacias were placed on the north side of a house, which was partially screened by a neighbouring Fjæld, the leaflets turned upwards, without however wholly closing, and the same thing was noticed in rainy weather. The leaves of *Mimosa pudica* contracted in the lightest and clearest nights, and remained folded back for some hours.

Without entering further into the details of Dr. Schübeler's numerous experiments, we may summarise their results as follows:—

1. The grain of wheat, that has been grown in low lying lands, may be propagated with success on the high Fjælds, and will reach maturity earlier at such elevations, even although at a lower mean temperature. Such grain, after having been raised for several years at the highest elevation which admits of its cultivation, is found when transferred to its original locality to ripen earlier than the other crops which had not been moved. The same result is noticeable in grain that has been transported from a southern to a more northern locality, and *vice versa*.

2. Seeds imported from a southern locality, when sown within the limits compatible with their cultivation, increase in size and weight, and these same seeds, when removed from a more northern locality to their original southern home, gradually diminish to their former dimensions. A similar change is observable in the leaves and blossoms of various kinds of trees and other plants. Further, it is found that plants raised from seed, ripened in a northern locality, are hardier, as well as larger than those grown in the south, and are better able to resist excessive cold.

3. The further north we go—within certain fixed limits—the more energetic is the development of the pigment in flowers, leaves and seeds. Similarly, the aroma, or flavour of various plants or fruits, is augmented in intensity the further north they are carried within the limits of their capacity for cultivation, conversely, the quantity of saccharine matter diminishes in proportion as the plant is carried further northward.

MYTHOLOGIC PHILOSOPHY¹

1. *THE GENESIS OF PHILOSOPHY.*—The wonders of the course of nature have ever challenged attention. In savagery, in barbarism, and in civilisation alike, the mind of man has sought the explanation of things. The movements of the heavenly bodies, the change of seasons, the succession of night and day, the powers of the air, majestic mountains, ever-flowing rivers, perennial springs, the flight of birds, the gliding of serpents, the growth of trees, the blooming of flowers, the forms of storm-carved rocks, the mysteries of life and death, the institutions of society—many are the things to be explained.

The yearning to know is universal. *How* and *why* are ever-

¹ From Vice-Presidential Address of Prof. J. W. Powell, of Washington, Vice-President Section B, American Association for the Advancement of Science, Saratoga Meeting, August, 1879.

lasting interrogatories profoundly instinct in humanity. In the evolution of the human mind the instinct of cosmic interrogation follows hard upon the instinct of self-preservation.

In all the operations of nature man's weal and woe is involved. A cold wave sweeps from the north, rivers and lakes are frozen, forests are buried under snows, and the fierce winds almost congeal the life fluids of man himself, and man's sources of supply under the rocks of water. At another time the heavens are as brass, and the clouds come and go with mockery of unfulfilled promises of rain, the fierce midsummer sun pours its beams upon the sands, and scorching blasts heated in the furnace of the desert sear the vegetation, and the fruits, which in more congenial seasons are subsistence and luxury, shrivel before the eyes of famishing men. A river rages and destroys the adjacent valley with its flood. A mountain bursts forth with its rivers of hell, the land is buried, and the people are swept away. Lightning shivers a tree and rends a skull.

The silent, unseen powers of nature, too, are at work bringing pain or joy, health or sickness, life or death to mankind. In like manner, man's welfare is involved in all the institutions of society.

How and *why* are the questions asked about all these things—questions springing from the deepest instinct of self-preservation.

In all stages of savage, barbaric, and civilised inquiry, every question has found an answer, every *how* has had its *thus*, every *why* its *because*. The sum of the answers to the questions raised by any people constitute its philosophy; hence all people have had philosophies consisting of their accepted explanation of things. Such a philosophy must necessarily result from the primary instincts developed in man in the early progress of his differentiation from the beast. This I postulate; if demonstration is necessary, demonstration is at hand.

Not only has every people a philosophy, but every stage of culture is characterised by its stage of philosophy. Philosophy has been unfolded with the evolution of the human understanding. The history of philosophy is the history of human opinions from the earlier to the later days—from the lower to the higher culture. In the production of a philosophy phenomena must be discerned, phenomena must be discriminated, phenomena must be classified. Discernment, discrimination, and classification are the processes by which a philosophy is developed. In studying the philosophy of a people at any stage of culture, to understand what such a people entertain as the sum of their knowledge, it is necessary that we should understand what phenomena they saw, heard, felt—discerned; what discriminations they made, and what resemblances they seized upon as a basis for the classification on which their explanations rested. A philosophy will be higher in the scale, nearer the truth, as the discernment is wider, the discriminations nicer, and the classification better.

The sense of the savage is dull compared with the sense of the civilised man. There is a myth current in civilisation to the effect that the barbarian has highly-developed perceptive faculties. It has no more foundation than the myth of the wisdom of the owl. A savage sees but few sights, hears but few sounds, tastes but few flavours, smells but few odours, his whole sensuous life is narrow and blunt, and his facts, that are made up of the combination of sensuous impressions, are few.

In comparison the civilised man has his vision extended away toward the infinitesimal and away toward the infinite; his perception of sound is multiplied to the comprehension of rapturous symphonies; his perception of taste is increased to the enjoyment of delicious viands; his perception of smell is developed to the appreciation of most exquisite perfumes; and the facts that are made up of his combination of sensuous impressions are multiplied beyond enumeration. The stages of discernment, from the lowest savage to the highest civilised man, constitute a series, the end of which is far from the beginning.

If the discernment of the savage is little, his discrimination is less. All his sensuous perceptions are confused, but the confusion of confusion is that universal habit of savagery—the confusion of the objective with the subjective, so that the savage sees, hears, tastes, smells, feels the imaginings of his own mind. Subjectively determined sensuous processes are diseases in civilisation, but normal functional methods in savagery.

The savage philosopher classifies by obvious resemblances—*analogic* characters. The civilised philosopher classifies by essential affinities—*homologic* characteristics; and the progress of philosophy is marked by changes from *analogic* categories to *homologic* categories.